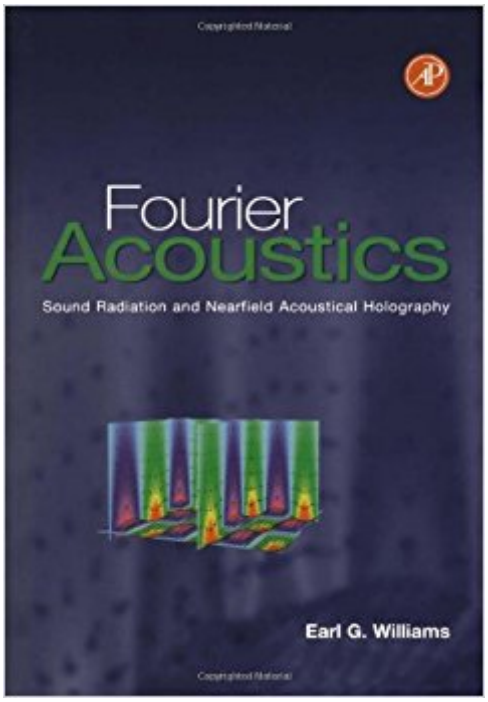
Fourier Acoustics: Sound Radiation And Nearfield Acoustical Holography



Synopsis

Intended a both a textbook and a reference, Fourier Acoustics develops the theory of sound radiation uniquely from the viewpoint of Fourier Analysis. This powerful perspective of sound radiation provides the reader with a comprehensive and practical understanding which will enable him or her to diagnose and solve sound and vibration problems in the 21st Century. As a result of this perspective, Fourier Acoustics is able to present thoroughly and simply, for the first time in book form, the theory of nearfield acoustical holography, an important technique which has revolutionised the measurement of sound. Relying little on material outside the book, Fourier Acoustics will be invaluable as a graduate level text as well as a reference for researchers in academia and industry.The physics of wave propogation and sound vibration in homogeneous mediaAcoustics, such as radiation of sound, and radiation from vibrating surfacesInverse problems, such as the theory of nearfield acoustical holographyMathematics of specialized functions, such as spherical harmonics

Book Information

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Customer Reviews

"Dr. Williams should be commended for clearly communicating his exceptional contributions and understanding of NAH and structural acoustics."--J. ADIN MANN III, Iowa State University, Journal of the Acoustical Society of America"...a nice book...recommended to both students of acoustics and also to institutional libraries."--Applied Mechanics Reviews, Volume 54 (1), Jan 2001

Fourier Acoustics develops the theory of sound radiation completely from the viewpoint of Fourier analysis. This powerful perspective of sound radiation provides the reader with a comprehensive and practical understanding which will enable him or her to diagnose and solve sound and vibration problems of the 21st century. As a result of this perspective, Fourier Acoustics is able to present thoroughly and simply, for the first time in book form, the theory of nearfield acoustical holography, an important technique which has revolutionized the measurement of sound. The book includes: The physics of wave propagation and sound radiation in homogeneous mediaAcoustics, such as radiation of sound, and radiation from vibrating surfacesInverse problems, for example the thorough development of the theory of nearfield acoustical holographyMathematics of specialized functions, such as spherical harmonics The author is an internationally recognized acoustician whose pioneering research in the field of nearfield acoustical holography has impacted acoustics research and development throughout the world. Dr. Williams' research has been formally recognized by NRL as one of its most innovative technologies over the past 75 years. Relying little on material outside the book, Fourier Acoustics will be invaluable as a graduate level text as well as a reference for researchers in academia and industry. The book is unique amongst acoustics texts, it is well illustrated and it includes exercises to enforce the theory.

The subject matter is not cohesively developed. The basic physical acoustic relationship are simply stated without any introductory background. Each section of each chapter are full long winded equations without any intuitive physical explanation. Even the mathematical concept are simply named and not introduced and explained properly. I bought this book with the hope it will show how to develop application of Fourier Transforms to Acoustic problems methodically and logically, but I was disappointed to only see a series formulas only. This is not an even an advanced book.

I am very pleased with this book. A must have for physical acousticians. The book has clear explanations of all the concepts and great pictures.. Love it.

The condition was very good, It was exactly what I expected.

The part of this book that I've read, chapter 2, I found neither fundamental nor concise. The author immediately gives the acoustic wave equation and Euler's equation in Eqs. (2.1) and (2.2), respectively, followed by a derivation of the latter. Other books more instructively derive Euler's equation first and then give the constitutive relation (-dp/dt = k*div(v), were p is the pressure, k the

fluid compressibility, v the velocity field, and div() the divergence operator), whence the wave equation can be simply derived.Further on, in Section (2.5), in the expression for the time-averaged acoustic intensity, the author does not state the assumption that Eq. (2.16) holds for harmonic fields (cf. Jacobsen, [...]), instead hand waving that "the one-half results results from the time average process". Further, the symbols p(omega) and v(omega) in this equation actually represent the complex amplitudes of the harmonic pressure and velocity fields, and not their Fourier transforms as the notation suggests.In short, parts of chapter 2 are imprecise to the verge of being erroneous.

This is a "must have" book for everyone who deals with acoustic radiation. The treatment of nearfield acoustic holography was scattered all over the scientific literature about acoustics. Now one has a reference point, where all the main aspects of the subject are dealt with in a clear, didactic way. The chapters are very well organized, containing an introduction on the basic aspects of signal processing and leading naturally to a good understanding of the subject.